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2010

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Jerry Wenjie Ping
National University of Singapore, pingwenjie@comp.nus.edu.sg

Khim Yong Goh
National University of Singapore, gohky@comp.nus.edu.sg

Hock Hai Teo
National University of Singapore, teohh@comp.nus.edu.sg

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Completed Research Paper

Jerry Wenjie Ping
Department of Information Systems
National University of Singapore
COM 2, #02-33, 15 Computing Drive,
Singapore 117418
pingwenjie@comp.nus.edu.sg

Khim Yong Goh
Department of Information Systems
National University of Singapore
COM 2, #02-33, 15 Computing Drive,
Singapore 117418
gohky@comp.nus.edu.sg

Hock Hai Teo
Department of Information Systems
National University of Singapore
COM 2, #02-33, 15 Computing Drive, Singapore 117418
teohh@comp.nus.edu.sg

Abstract

*Advergames are increasingly used by companies for online advertising campaigns. However, the effectiveness of this unique advertising strategy has not been investigated in the IS research literature. This study sheds light on the effectiveness of advergames by introducing three design elements of an advergame: interactivity (the extent to which a player has control over the choice of viewing the advertising message), relevancy (the extent to which the game context identifies with the advertising information), and expectancy (the extent to which the advergame form is within the expectation of the player). Two dependent variables, attitude toward advergame and attitude toward brand, are used to evaluate the effectiveness of the advergame. Based on the transportation theory, we hypothesized two-way interaction effects between each pair of the three independent variables on the attitude toward the advergame, and also main effects of the dependent variables on the attitude toward a brand. A 2*2*2 factorial design experiment in a virtual world environment was used to test our hypotheses. The results indicate that in the condition of high relevancy, a more favorable attitude toward advergame was found for both high interactivity and low expectancy. Contrary to our hypothesis, in the low interactivity condition, high expectancy generates a more positive attitude toward advergame. Interestingly, interactivity was the only independent variable found to have a significant effect on the attitude toward brand.*

Keywords: Advergame, Interactivity, Relevancy, Expectancy, Transportation Theory, Attitude toward Advergame, Attitude toward Brand

Introduction

Through decades, marketers are spending a great amount of dollars in advertising to promote their products or brands. Various media have been used to convey the message of advertising, from printed material, radio, television, movie to website banners. Recently, advergame, as a new medium for advertising, is experiencing a boom. An advergame refers to an integration of advertising messages in custom-built games aimed to promote the product or brand to potential consumers while these customers are engaged in the game play (Buckner et al. 2002; Mallinckrodt et al. 2007). The traditional 30-second TV spot costs millions and may not make a lasting impression on the consumer. Advertisers are worried about the low click-through rates for conventional website banner ads. The advergame itself provides a potential solution to these problems by providing the consumer with an interactive engaging experience which may bring about positive advertising responses.

Different from in-game ads, the advergame is custom designed for the sponsoring brand (Wise et al. 2008). In the advergame, the advertising message plays a dominant role in the advergame. However for in-game ads, they are typically placed in the background of the game (Winkler et al. 2006). These in-game ads in existing video games are simply integration of brand identifiers similar to product placement in movies (Lee et al. 2007; Nelson et al. 2006; Yang et al. 2006). In contrast, in the advergames, the role of the consumer has been changed from a passive observer to an active player (Buckner et al. 2002). Advergames, as creative advertising campaigns, are becoming prevalent in commercial web sites, in online communities, and in mobile platforms (Steel 2010). Through blurring the line between entertainment and persuasion (Grigorovici et al. 2004; Kretchmer 2004; Shrum 2004), the advergame tries to offer consumers an interactive entertainment environment so that the player may form an emotional connection between the game and the brand featured within it (Dahl et al. 2009). The charm lies in the delivery of the advertising message which becomes engaging and effective so that consumers are keen to interact with it. With custom designed advergames, companies are able to improve branding and boost product awareness, and at the same time, collect detailed information about consumers who just have a seamless and interactive game experience (Afshar et al. 2004; Buckner et al. 2002; Gurău 2008; Van der Graaf et al. 2003). The advergame can be transmitted online to attract more potential consumers, as friends are usually encouraged or challenged to play popular games (Buckner et al. 2002). A well-designed advergame is typically played for from 5 to 35 minutes. With the appeal of prolonged interactive brand exposure to the player at a small fraction of current costs, marketers are actively promoting advergames and diverting their advertising dollars from television to the advergame. According to Boston research firm Yankee Group, the advergame industry has generated more than $300 million in 2009, up from $83.6 million in 2004. Indeed, the emerging trend of using advergame clearly demonstrates the importance of a detailed investigation on the effectiveness of the advergame.

In spite of the size of the market and its reported growth rate, for this new form of interactive advertising, relatively little empirical research has been undertaken. Few studies have focused on the effectiveness of the advergame in terms of the design elements. Most of the previous researchers studied the effectiveness of traditional product placement rather than the advergame (Glass 2007; Kretchmer 2004; Lee et al. 2007; Molesworth 2006; Nelson 2002; Nelson et al. 2004; Winkler et al. 2006). Lacking comprehensive research on the effectiveness of the advergame, it remains unclear how to design a good advergame on both practical and theoretical terms. Therefore, this study aims to uncover the black box of the effectiveness of the advergame and to provide suggestions and implications for both researchers and practitioners.

This raises two important research questions in this study: a) What are the fundamental design elements for the effectiveness of advergame? b) How do these design elements influence the effectiveness of the advergame? Aiming to provide in-depth insights into the design elements of the advergame, this study investigates two indicators of advertising effectiveness, attitude toward the advergame and attitude toward the brand. These two indicators are of the most interest to advertisers and are direct measures of the effectiveness of the advergame (Gardner 1985; Homer 1990; Homer 2006; Lutz et al. 1983; MacKenzie et al. 1989; MacKenzie et al. 1986; Mittal 1990).

Literature Review

In the eye of advertisers, the ultimate goal of the advertisement is persuasion (Barry 1987). The nature of the advergame is to persuade the consumer to form a positive attitude toward the brand promoted. Many studies investigated the effectiveness of advergame (Hernandez et al. 2004; Mallinckrodt et al. 2007; Smith 2007; Winkler et al. 2006; Wise et al. 2008; Youn et al. 2005). However, few of them tried to theoretically figure out the

fundamental design elements which may influence the effectiveness. Based on the review of the human-computer interaction (HCI) and advertising literature, we decide to draw on transportation theory to examine how the unique characteristics of the advergame influence its advertising effectiveness. We propose three important factors, interactivity, relevancy and expectancy which we believe are critical for the effectiveness of the advergame.

Interactivity

Computer or video games are featured with one important defining characteristic, interactivity (Berman et al. 1995; Bezjian-Avery et al. 1998; Nicovich 2005). Interactivity has received much attention in the HCI literature (Shneiderman et al. 1998). Many researchers from different disciplines had defined interactivity in distinct angles (Blattberg et al. 1991; Deighton 1996; Hoffman et al. 1996; Pavlik 1996; Rafaeli 1988; Rafaeli et al. 1997; Steuer 1992; Steuer et al. 1995; Williams et al. 1988). These definitions can be classified in three categories, user-machine interaction, user-user interaction, or user-message interaction (Cho et al. 1997). By reviewing the interactivity literature, Liu et al. (2002) further specified three dimensions of interactivity: active control, two-way communication, and synchronicity. In the context of advergame, the advertiser intends to persuade the player with its advertising message. Thus, the interaction occurs between the player and the advertising message. And in accordance with the nature of game play, control is a dominant feature for game design (Kafai 1995; Sweetser et al. 2005). In the advergame, the player could have control on actively viewing the advertising message instead of being passively exposed. Therefore, the interactivity in advergame falls into the category of user-message interaction and is in the dimension of active control. Following the original definition for user-message interaction, "the extent to which users can participate in modifying the form and content of a mediated environment in real time" (Steuer 1992, p.84), we choose the dimension of active control to define interactivity in an advergame context. Interactivity is defined as the extent to which the player can interact with the advertising message by having the control on the choice of viewing and manipulating it. In this study, the high interactivity refers to the situation that the player can interact with the advertising message by having extensive control on the choice of viewing it in the advergame, while the low interactivity refers to only passively viewing the advertising message.

Relevancy and Expectancy

For research on advertising effectiveness, many studies have focused on the concept of congruity (Dolich 1969; Kamins 1990; McQuarrie et al. 1992; Misra Sharon 1990; Russell 2002; Zhang et al. 1996). However, in the game context, conflicting findings on congruity were reported (Lee et al. 2007; Wise et al. 2008). For the conflicting findings, they may overlooked one study which identifies two dimensions of thematic relationships, relevancy and expectancy (Goodman 1980). Goodman's (1980) paper offers an insightful perspective in understanding congruity. Later, these two dimensions of relevancy and expectancy had been used to study between picture information and an evoked advertisement (ad) theme (Heckler et al. 1992). In Heckler et al.'s (1992) paper, relevancy is defined as material pertaining directly to the meaning of the theme. It is used to reflect how information contained in the stimulus contributes to the clear identification of the theme or primary message being communicated. While expectancy is defined as the degree to which an item or piece of information falls into some predetermined pattern or structure evoked by the theme. According to the cognitive structure of the person, the expectancy of the information being presented derives from preexisting knowledge structures associated with the theme. Aiming to provide explanation to the conflicting findings of past studies, we investigate these two dimensions in the context of advergame. We hope this refinement of the concept will provide more insightful theoretical contributions. Therefore, we define relevancy here as the extent to which the advergame identifies the theme of the advertised information; whereas expectancy is defined as the extent to which the advergame played is within the expectation of the player comparing to the existing knowledge or preconceptions in similar conventional games.

Transportation Theory

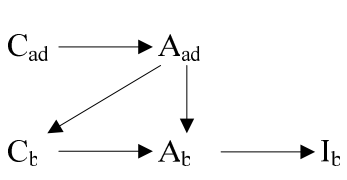
The concept of transportation is theoretically defined as "a convergent process, where all mental systems and capacities become focused on events occurring in the narrative" (Green et al. 2000). Transportation is the extent of absorption into the narrative flow of the story as it unfolds. The transportation theory posits a transportation into a narrative world that the feeling of being lost in the world of a narrative, of being completely immersed in a story and leaving the real world behind. Media content consumption usually involves the element of fun which makes people happy in the process of being entertained (Brock et al. 2004; Escalas 2004). According to this theory, individuals in

any hedonic consumption of a media content may be absorbed or transported into the narrative world portrayed. This experience is a key mechanism underlying the influence of stories or narratives on individuals' attitudes and beliefs. And this experience can further lead to certain benefits that are interpreted by individuals as enjoyment (Green et al. 2004).These positive feelings evoked by mental simulation can be transferred to the advertised product (Glass 2007; Homer 2006).

The transportation experience is found to be easily triggered in the game context (Sweetser et al. 2005) and the power of transportation may be more prominent due to the interactive nature of the game (Turkle 1997). Ad exposure is found to have an influence on the transportation (Wang et al. 2006). The concept of interactivity in advergame could manipulate the ad exposure in an interactive way, which we think could further affect the transportation experience. Studies had shown that in ads with a lower level of intrusion, the transportation experience was not interrupted and it could lead to a more favorable attitude toward the ad (Wang et al. 2006). Congruity was found to be an important antecedent for intrusiveness (Edwards et al. 2002; Hernandez et al. 2004; Moore et al. 2005; Russell 2002). By looking at the two dimensions of congruity, relevancy and expectancy, we aim to set up a theoretical linkage between these two dimensions and the transportation theory. In sum, we try to investigate different combination of the three design elements, interactivity, relevancy and expectancy. We believe that with the proper combination of manipulations on these design elements, the advergame may facilitate a pleasurable transportation experience when plying the advergame. Thus, a positive experience of transportation will be associated with the advergame and brand advertised (Green et al. 2004).

Hypotheses Development

For the relationship between our two dependent variables, attitude toward advergame (A_{ad}) and attitude toward brand (A_b), studies had proved that a Dual Mediation Hypothesis (DMH) (Figure 1) is validated (Homer 1990; MacKenzie et al. 1986). The dual mediation model postulates that attitude toward ad (A_{ad}) influences attitude toward brand (A_b) both directly and indirectly through its effect of brand cognitions.



C_{ad} - ad cognitions
C_b - brand cognitions
A_{ad} - attitude toward the ad
A_b - attitude toward the brand
I_b - intention to purchase the brand

Figure 1. Dual Mediation Hypothesis (DMH)

As there is a grounded relationship between A_{ad} and A_b, in the hypotheses of our study, we propose two-way interaction effects between interactivity, relevancy and expectancy on A_{ad} and main effects of these three variables on A_b. Our research model is shown in Figure 2.

Interactivity and Relevancy

Different from traditional passive media, in advergames, brand identifiers are embedded as active game components (Nelson 2002; Wu 1999). Here, brand identifiers refer to those game components which have the advertising message (i.e., logo and stylized text) embedded in. The essential characteristic of advergame is that the player can play with the game component with integrated advertising message. These active game components are usually used as tools or equipment which help the player to win the game or gain extra energy or bonus (Lee et al. 2009). High level of interactivity enables the player to have the control to play with these game components and actively viewing the advertising message. As these game components can help the player to win or provide bonus, the player is more likely to be attracted to play with them. Further, the highly involved nature of the advergame makes the player pay more attention on these active game components, thus, much of the player's attention will be attracted to the advertising message integrated with the game component (Kahneman 1973). With high involvement in the

advergame, the player is more easily immersed in the fun of the advergame (Nicovich 2005). According to transportation theory, the transportation experience is thus triggered. Enjoyment is shown to be an positive experience from playing games (Holbrook et al. 1984; Sweetser et al. 2005). Thus, it is very likely that the positive experience of transportation will be associated with the advergame.

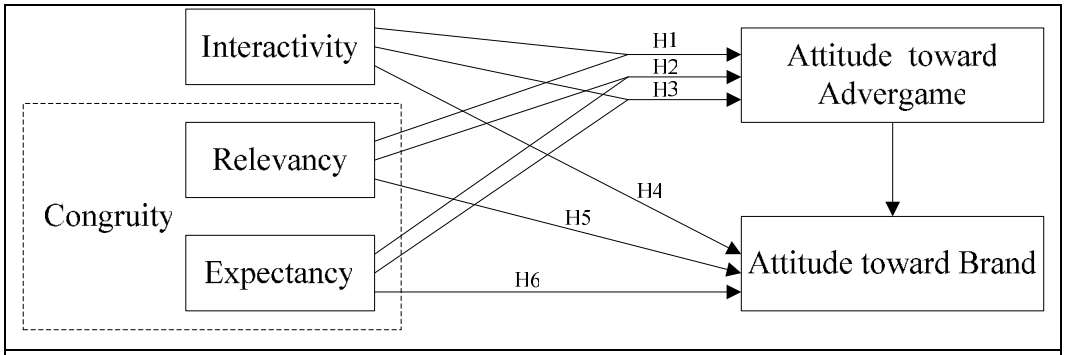


Figure 2. Research Model

As for relevancy, it has been shown that when the advertised information is relevant to the advertisement, little effort will be required to process the information (Hastie 1980; Hastie 1981; Scrull 1981; Srull et al. 1985). In high levels of relevancy, the advergame is relevant to the theme of the advertised information, and less intrusiveness was found (Hernandez et al. 2004). More positive attitude toward the ad was reported when the game context can highly identify the theme of the advertised band (Green et al. 2004; Russell 2002; Shamdasani et al. 2001; Wise et al. 2008).

Given the relevant advertised information, the positive transportation experience triggered by the interactivity should further enhance advertising effectiveness. In this high interactivity and high relevant situation, the player can totally enjoy himself in an immersive context because the relevant ad exposure does not interrupt the transportation experience. On the other hand, when the relevancy is low, the transportation experience may be deterred or interrupted by the irrelevant advertised information. The positive effects of the interactivity may not be distinct, thus the positive transportation experience fails to play its role in this case. Therefore, we propose:

> **H1:** *There is an interaction effect between interactivity and relevancy on attitude toward advergame. Under the condition of high relevancy, high interactivity results in better attitude toward advergame than that in low interactivity. However, under low relevancy condition, both high and low interactivity result in the same level of attitude toward advergame.*

Relevancy and Expectancy

The level of expectancy is low when the game components are out of the expectation of the player. In low expectancy situation, some game components of the advergame appear in more creative forms than traditional games. Thus, the advergame will be more novel and elicit more favorable cognitive responses (Sparkman et al. 1980; Yi 1990). With the creative forms of the game component, the player will be curious about playing the advergame. Curiosity is found as one of the elements which the player can be intrinsically motivated (Malone 1981), and curiosity is also one of the conditions necessary for immersion experience (Qin et al. 2009). This immersion experience could also trigger the transportation experience if the expectancy is low enough. More elaborative processing will occur when the player perceives unexpected information (Heckler et al. 1992), which will further enhance the transportation experience.

Previous study shows that less intrusiveness is perceived when the advertised information is relevant to the theme of the game (Hernandez et al. 2004). According to the persuasive knowledge model, it is argued that when consumers recognize the persuasive attempt in the advertising message, the message is processed differently than when there is no recognition of the persuasive attempt (Raney et al. 2003). Thus, the irrelevant advertised information may cause the persuasive message to be more prominent for the advergame. While the player is attracted by the creativeness of

the advergame, the persuasive message may arouse the resistance of the player to the advergame. This resistance of the advertised message may disrupt the experience when the player is enjoying the game. Therefore, it is expected that under a relevant context, player can enjoy the game more without feeling uncomfortable with the irrelevant information and form a better attitude toward the advergame. Therefore, we hypothesize that:

> **H2:** *There is an interaction effect between relevancy and expectancy on attitude toward advergame. Under the condition of high relevancy, low expectancy results in better attitude toward advergame than that in high expectancy. However, under low relevancy condition, both high and low expectancy result in the same level of attitude toward advergame.*

Interactivity and Expectancy

When the interactivity level is high, the player has the control to interact with the advertised message. With the highly immersive experience, the player may form the transportation experience more easily. And in the low expectancy level, the unexpected game components make the advergame to be creative and attract the player to enjoy the novelty of the advergame. As the transportation experience is triggered by the high interactivity, this low expectancy may further encourage the player to explore the advergame and enjoy it. Thus, a more favorable attitude the advergame is expected through this immersive exploration experience. However, if the expectancy level is high, game design is totally within the expectation of the player. This advergame may be too prototypical so that it may not be able to distinguish itself from traditional games. With less interest shown for the advergame, the player may not be that encouraged to explore the advergame. If the interactivity is low, the transportation experience can hardly be triggered, so that the player may not be interested in the novelty introduced by the low expectancy and may stop playing with the advergame. Thus, the expectancy may not influence the attitude toward advergame in this case. Therefore, we hypothesize that:

> **H3:** *There is an interaction effect between interactivity and expectancy on attitude toward advergame. Under the condition of high interactivity, low expectancy results in better attitude toward advergame than that in high expectancy. However, under low interactivity condition, both high and low interactivity result in the same level of attitude toward advergame.*

Main Effects on Attitude toward Brand

Lee et al. (2007) suggest focal brands have a recognition superiority than peripheral ones and brand recall is high when the brand is a major part of game play (Nelson 2002). As the advertising message is integrated into the game component, more attention to the brand will be given when the player is interacting with the game component. Triggered by the high level of interactivity, the player is in such a transportation experience and enjoys the fun of the game. If the mental simulation while playing the game evokes positive feelings, those feelings can get transferred to the advertised brand (Glass 2007; Homer 2006). The transportation theory thus suggests that the brand integrated in the advergame can be perceived more positively if the player has a positive feeling when playing with the active game component. Thus, we hypothesize,

> **H4:** *The interactivity level of the advergame is positively related to the attitude toward the brand.*

Hernandez et al. (2004) found that, in electronic games, players enjoy product placement displays when the placement makes sense in the game context. Such an enjoyment during the playing of the game may turn into positive attitude toward brand embedded. Moreover, as the game context can identify the theme of the advertised information, the player receives less intrusions. The transportation experience is more likely to happen and the enjoyment from playing the advergame is possibly been transferred to the advertised brand. Therefore, we posit,

> **H5:** *The relevancy level of the advergame is positively related to the attitude toward the brand.*

Previous researches show that recall for unexpected information will be better than for expected information because of the increased processing effort required to encode this information (Srull et al. 1989; Srull et al. 1985). The low level of expectancy of the advergame may generate surprise to the player and such a surprise may heighten curiosity. More attention will be paid to the brand embedded in the advergame. If the player is having fun with the advergame, we expect this pleasurable experience could be transferred to the advertised brand. Thus, a more positive effect on the attitude toward the brand is likely to be produced. Thus, we hypothesize that

H6: *The expectancy level of the advergame is negatively related to the attitude toward the brand.*

Control Variables

Prior studies have shown that experience in previous similar games may influence the perception of the game played (Castel et al. 2005; Green et al. 2007). Brand familiarity, attitude toward advertising in general, and attitude toward the brand before the experiment could also influence the attitude toward the advergame and the attitude toward the brand (Kent et al. 1994a; Lutz 1985; Monroe 1976). We include all these variables as well as the demographics of the subjects as covariates to isolate the effects of the three independent variables.

Research Methodology

Experiment Design

The proposed hypotheses in the present study were tested through a laboratory experiment with a 2×2×2 between-subject design (i.e., 2 levels of interactivity × 2 levels of relevancy × 2 levels of expectancy). A vehicle racing game was designed for the present study in an online 3D virtual world. Four large billboards are set up around the racing track. Advertising information of the advertised brand is shown on all of the four billboards. The four billboards are large in size and set up strategically around the track so that at least one billboard can be seen anywhere in the track. The player who finishes the allocated laps within the minimum time is considered the winner of the advergame.

Interactivity

In the advergame, interactivity was manipulated by the extent to which a player can interact with the advertising message by controlling the vehicle to generate a speed boost and in the process also viewing the advertising message. In the low interactivity condition, the player can only passively view the billboards to get the advertised information. While in the high interactivity condition, besides the four billboards, there are four enlarged samples of the advertised brand scattered around the race track. In addition to viewing the billboards, when traversing around the race track, a player can control the vehicle to hit the advertised samples in order to get a speed boost. The acceleration due to the speed boost is designed to be large so that the player can easily discern the acceleration impact as a result of "interaction" with the advertised brand. Along with the boost, the logo of the advertised brand will flash at the top of the avatar. The boost and the flash will last for five seconds. Thus, as the speed boost can help the player to drive fast, they are more attracted to hit the advertised product so as to win the game. Therefore, the advertising message is more likely to be seen by the player.

Relevancy

For relevancy, two brands, Red Bull (energy drink) and Marigold HL (milk), were used to represent two levels of the relevancy. Red Bull is associated with the high relevancy treatment since Red Bull is an energy drink brand. The context of the racing game can identify with the real life advertising theme that Red Bull gives you energy after drinking. In contrast, Marigold HL is a milk brand whose brand image is about drinking milk as a healthy beverage. The context of racing game thus does not fit the advertising message and brand image of Marigold HL. Therefore, Marigold HL is considered appropriate for the low relevancy treatment. In the high relevancy situation (Red Bull), all the adverting information will be about Red Bull, the four billboards shows Red Bull advertising messages. The products placed on the track in the high interactivity situation are cans of Red Bull; while in the low interactivity situation, there are no cans of Red Bull on the track. When the player drive into the Red Bull cans on the track, they will get a speed boost and see the advertised message "Red Bull gives you wings" flashed on the top of their avatar during the acceleration. For the low level of relevancy, all the billboards show the advertising information of Marigold HL milk. The advertised products in the high interactivity condition will be conventional rectangular milk packs with triangular top. Upon getting a speed boost, the advertised message shown is "The perfect balance of highs and lows." And, in the low interactivity situation there are no packages of milk on the track.

Expectancy

For expectancy level, we manipulated it through controlling the design of the vehicle in the racing game. For the high expectancy condition, we designed the vehicle to resemble a Formula One racing car. For the low expectancy condition, we designed the vehicle to resemble a crab-like creature. Our premise is that such a crab-like creature is seldom used as a vehicle in conventional racing games, and thus game players would be least expected to see it – befitting the low expectancy treatment. When the player enters the advergame settings, they only see the racing track without the vehicles in sight. The player can only see the vehicle (either a car or a crab) after choosing the color of the vehicle. The car or crab been chosen will be then used in the racing game afterwards.

For all the three independent variables, each has two levels, high and low. Eight experiment treatments were designed. Table 1 shows the illustration of the eight experiment treatments. Measures for the manipulation check are listed in Table 2. Figure 3 to Figure 6 show the screen shots of 4 representative treatments (Int, Rel and Exp stand for Interactivity, Relevancy and Expectancy respectively). The measurement for the two dependent variables and covariates are listed in Table 3.

Table 1. Illustration of Experiment Treatments

		Expectancy (High)	Expectancy (Low)
Interactivity (High)	Relevancy (High)	Red Bull Cans + Red Bull Billboards + Car Vehicle	Red Bull Cans + Red Bull Billboards + Crab Vehicle
	Relevancy (Low)	Marigold Milk Packs + Marigold Billboards + Car Vehicle	Marigold Milk Pack + Marigold Billboards +Crab Vehicle
Interactivity (Low)	Relevancy (High)	Red Bull Billboards + Car Vehicle	Red Bull Billboards + Crab Vehicle
	Relevancy (Low)	Marigold Billboards + Car Vehicle	Marigold Billboards + Crab Vehicle

Table 2. Measures for Manipulation Check

1-7 Likert scales are used. 1 = Strongly disagree, 7 = Strongly agree	
Interactivity	1. I think I had interacted with the brand information in this advergame. 2. I think I had interactive exposure to the brand information in this advergame. 3. I think I had interactive experience with the brand information in this advergame.
Relevancy	1. I think the theme of racing game is relevant to the Red Bull / Marigold brand. 2. I think the brand image of Red Bull / Marigold is relevant to the racing game. 3. I think the use of a racing game is appropriate for Red Bull / Marigold brand.
Expectancy	1. I think the racing / crab car I drove is within my expectation before playing this advergame. 2. I think the design of the racing / crab car I drove is within my expectation before playing this advergame. 3. I think the design of the racing / crab car I drove is same from conventional designs available in racing games.

Figure 3. Low Int * High Rel * High Exp

Figure 4. High Int * High Rel * Low Exp

Figure 5. Low Int * Low Rel * Low Exp

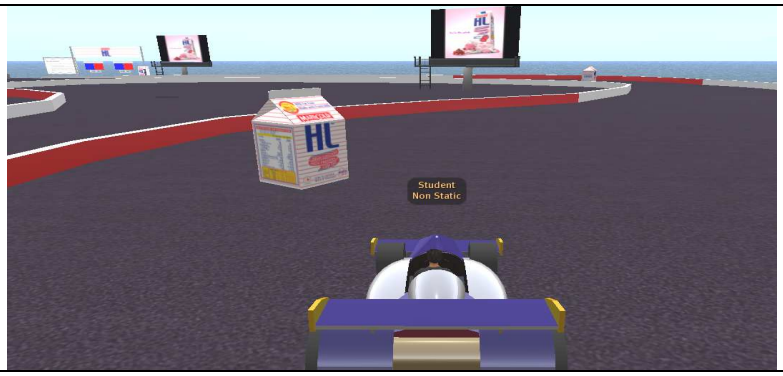


Figure 6. High Int * Low Rel * High Exp

Table 3. Measurement for Constructs		
1-7 Likert scales are used, 1 = left hand expression, 7 = right hand expression		
Attitude toward the Advergame	What's your opinion on this advergame? 1. Extremely unfavorable / extremely favorable 2. Extremely boring /extremely interesting 3. Extremely bad /extremely good 4. Extremely unpleasant /extremely pleasant 5. Extremely dislike / extremely like 6. Extremely uninteresting / extremely interesting	Adapted from (Gardner 1985; MacKenzie et al. 1989; MacKenzie et al. 1986)
Attitude toward the Brand	After playing this advergame, what is your overall feeling about Red Bull / Marigold? 1. Extremely unfavorable / extremely favorable 2. Extremely bad /extremely good 3. Extremely unpleasant /extremely pleasant 4. Extremely undesirable / extremely desirable 5. Extremely negative / extremely positive 6. Extremely dislike / extremely like	Adapted from (MacKenzie et al. 1989; MacKenzie et al. 1986; Miniard et al. 1990; Mittal 1990)
Brand Familiarity	1. With regard to my familiarity with Red Bull / Marigold, I am _ Extremely unfamiliar / Extremely familiar 2. With regard to my experience with Red Bull / Marigold, I am _ Extremely inexperienced / Extremely experienced 3. With regard to my knowledge with Red Bull / Marigold, I am _ Extremely not knowledgeable / Extremely knowledgeable	Adopted from (Kent et al. 1994b)
Attitude towards the ads in general	What is your general opinion of advertisements by companies? 1. Extremely bad / extremely good 2. Extremely unpleasant / extremely pleasant 3. Extremely unfavorable / extremely favorable	Adopted from (MacKenzie et al. 1989)
Attitude towards the brand, before the experiment	What is your overall feeling about Red Bull / Marigold? 1. Extremely unfavorable / extremely favorable 2. Extremely bad /extremely good 3. Extremely unpleasant / extremely pleasant 4. Extremely undesirable / extremely desirable 5. Extremely negative / extremely positive 6. Extremely dislike / extremely like	Adapted from (MacKenzie et al. 1989; MacKenzie et al. 1986; Miniard et al. 1990; Mittal 1990)
Track Racing Game Experience	How much experience do you think you have you in track racing game? (1-7 Likert scale, 1= None, 7=Extensive)	Self-developed

Pilot Test

A pilot test was conducted to make sure all the treatments are manipulated according to experimental design (Perdue et al. 1986). 40 undergraduates were recruited and distributed evenly to the 8 treatment groups. The subjects did a pre-experiment questionnaire on the control variables. Then, they were asked to play the advergame we designed. Another questionnaire was administered to gather data on the perceptions of the advergame after they played the advergame. A manipulation check was done together with this questionnaire and demographic information was also gathered in the questionnaire. Feedback and suggestions were obtained after they finished the experiment. The advergame and the questionnaire were accordingly revised for the main test.

Participants

A total of 126 undergraduate students were recruited from a large university. Subjects were randomly assigned to the 8 treatments. Each subject received the equivalent of USD$7 as an incentive for participation. The responses of 121 subjects whose perceptions of the experiment treatments passed the manipulation check were used for data analysis. Among these subjects, 72 were males (59.5%) and 49 (40.5%) were females. The average age of the participants was 22.4. There was no significant difference in gender and age distribution across the treatments.

Procedure

All the subjects were randomly assigned to a treatment group. To increase the elements of fun and competitiveness in the advergame, for each session of the experiment, two subjects from the same treatment group were paired to compete against each other to determine which player reaches the finishing point first in the shortest time. Before the start of play, they were asked to fill in a pre-experiment questionnaire. Then, instructions were given on how to play the advergame. Before the actual race, subjects were asked to have a test drive for three rounds around the race track to get accustomed to advergame. They were told to drive as fast as they can and an internal timer recorded the track lap time. After completing the racing game, the subjects proceeded to complete the final questionnaire which measured their perceptions of the advergame.

Data Analysis

Manipulation Check

The manipulation of the independent variables was verified using manipulation check. Simple T-tests on the different levels for each independent variable show significant differences between the means for different levels of the treatment (see Table 4). Therefore, the manipulations for interactivity, relevancy and expectancy were all successful. Therefore, the manipulations for interactivity, relevancy and expectancy were all successful.

Table 4. Manipulation Checks

Independent Variable	Levels	N	Mean	Std. Dev.	T-statistics
Interactivity	High	60	5.00	1.25	t = 0.397
	Low	61	3.42	1.34	p < 0.001
Relevancy	High	59	5.29	1.30	t = 0.247
	Low	62	2.88	1.16	p < 0.001
Expectancy	High	62	4.08	1.11	t = 6.397
	Low	59	2.19	0.78	p < 0.001

Measurement Validation

All statistical tests were carried out at a 5% level of significance. Exploratory factor analysis (EFA) was conducted to test the instrument's convergent and discriminant validity for perceptual constructs. Table 5 reports the EFA results with principal component analysis and varimax rotation using SPSS. We found a five-factor structure with eigenvalues greater than 1.0. All constructs explained 75.32% of the total variance. All measure items loaded on the target factors respectively and scored above 0.76, indicating excellent construct validity (Cook et al. 1979). The constructs were assessed for reliability using Cronbach's alpha (Cronbach 1951). A value of at least 0.70 is suggested to indicate adequate reliability (Nunnally et al. 1994). The alphas for all constructs were well above 0.7. The results showed that all the measurement items in this study had achieved high reliability. After measurement validation, items of each construct were averaged as a measure of the target construct.

Table 5. Results of Exploratory Factor Analysis

Variables	Cronbach's α	Items	Item loading				
Brand Familiarity	0.839	fam1	.255	.149	.010	.080	**.806**
		fam2	.453	.077	-.039	.040	**.760**
		fam3	.171	.149	-.068	.082	**.829**
General Attitude toward Advergame	0.820	GattAd1	-.041	.068	.099	**.824**	.034
		GattAd2	.130	.061	.018	**.868**	.122
		GattAd3	.137	.087	-.089	**.845**	.022
Attitude toward Brand before the Experiment	0.931	attBd_bf1	**.838**	.196	-.013	.063	.182
		attBd_bf2	**.838**	.217	-.036	.107	.199
		attBd_bf3	**.842**	.131	.121	.170	.184
		attBd_bf4	**.775**	.120	.093	-.051	.095
		attBd_bf5	**.878**	.234	-.046	.063	.108
		attBd_bf6	**.809**	.160	-.072	.010	.138
Attitude toward Advergame	0.901	attAd1	.015	.165	**.760**	.028	-.117
		attAd2	-.029	.096	**.819**	-.102	.185
		attAd3	-.006	.256	**.802**	-.013	-.044
		attAd4	.120	.074	**.808**	.116	-.047
		attAd5	-.001	.191	**.871**	-.025	-.130
		attAd6	-.063	.195	**.765**	.037	.070
Attitude toward Brand after the Experiment	0.941	attBd_af1	.104	**.800**	.241	.157	.203
		attBd_af2	.228	**.867**	.171	.075	.077
		attBd_af3	.239	**.850**	.167	.144	.086
		attBd_af4	.161	**.768**	.120	-.120	.219
		attBd_af5	.174	**.842**	.242	.101	-.076
		attBd_af6	.235	**.857**	.214	.019	.050

Results on Attitude toward Advergame

The descriptive statistics of the experiment treatments on attitude toward advergame were presented in Table 6. The results of an ANCOVA test on the dependent variable attitude toward advergame showed that all the two-way interaction effects between the three independent variables are significant (see Table 7). None of the covariates had a significant effect. To further explore the interaction effects, simple main effect analysis was employed.

In support of H1, the relevancy and interactivity interaction effect was significant ($F = 11.415$, $p < 0.01$). In the condition of high relevancy, attitude toward advergame is significantly higher ($F = 1.685$, $p < 0.05$) for high interactivity ($N = 30$, Mean = 5.33, SD = .784) than low interactivity ($N = 29$, Mean = 4.56, SD = .892). In the condition of low relevancy, no significant main effect for interactivity was detected ($F = 0.017$, $p > 0.05$). Therefore, H1 was supported (see Figure 7).

In support of H2, the relevancy and expectancy interaction effect was significant ($F = 9.011$, $p < 0.01$). In the condition of high relevancy, attitude toward advergame is significantly higher ($F = 14.893$, $p < 0.05$) for low expectancy ($N = 29$, Mean = 5.25, SD = 0.595) than high expectancy ($N = 30$, Mean = 4.66, SD = 1.081). In the condition of low relevancy, no significant main effect for interactivity was detected ($F = 0.166$, $p > 0.05$). Therefore, H2 was supported (see Figure 8).

As for H3, the interactivity and expectancy interaction effect was significant ($F = 4.172$, $p < 0.05$). However, contrary to our hypothesis, in the condition of high interactivity, no significant main effect for expectancy was detected ($F = 0.019$, $p > 0.05$). However, in the condition of low interactivity, attitude toward ad is significantly higher ($F = 8.362$, $p < 0.05$) for low expectancy ($N = 31$, Mean = 5.07, SD = 0.775) than high expectancy ($N = 30$, Mean = 4.57, SD = 1.058). Therefore, H3 was not supported (see Figure 9).

Table 6. Descriptive Statistics on Attitude toward Advergame

Mean (N, SD)		Expectancy (High)	Expectancy (Low)
Interactivity (High)	Relevancy (High)	5.27 (16, 0.88)	5.39 (14, 0.69)
	Relevancy (Low)	5.02 (16, 0.91)	4.44 (14, 0.98)
Interactivity (Low)	Relevancy (High)	3.96 (14, 0.86)	5.11 (15, 0.48)
	Relevancy (Low)	5.10 (16, 0.94)	5.02 (16, 0.99)

Table 7. Results of ANCOVA on Attitude toward Advergame, $R^2 = 21.9\%$

Source		df	Mean Square	F	Sig.
Covariates	Brand Familiarity	1	.027	.035	.853
	General Attitude toward ad	1	.001	.001	.973
	Ab before the Experiment	1	.315	.408	.525
	Experience in Racing Games	1	.052	.068	.795
	Gender	1	.030	.039	.844
	Age	1	.035	.045	.832
Main Effect	Interactivity (Int)	1	1.241	1.608	.208
	Relevancy (Rel)	1	.112	.146	.703
	Expectancy (Exp)	1	.841	1.090	.299
Interaction Effect	Int * Rel	1	8.810	11.415	**.001****
	Int * Exp	1	4.172	5.406	**.022***
	Rel * Exp	1	6.954	9.011	**.003****
	Int * Rel * Exp	1	.583	.755	.387
*p < 0.05, **p < 0.01					

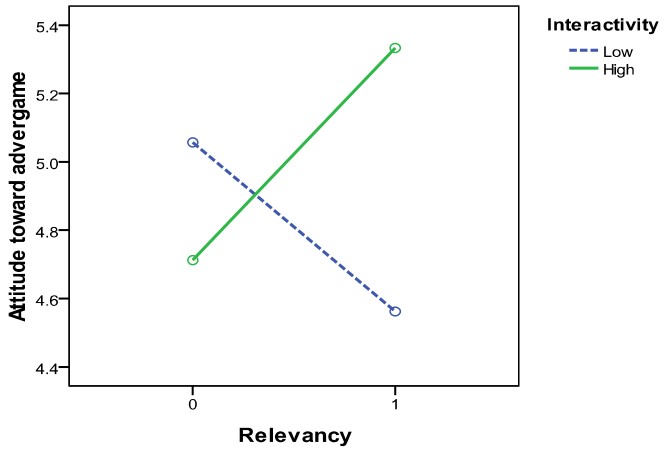


Figure 7. Interaction Effect (Relevancy * Interactivity)

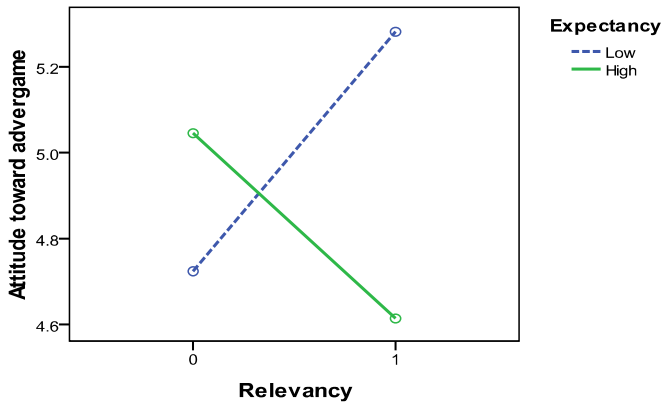


Figure 8. Interaction Effect (Relevancy * Expectancy)

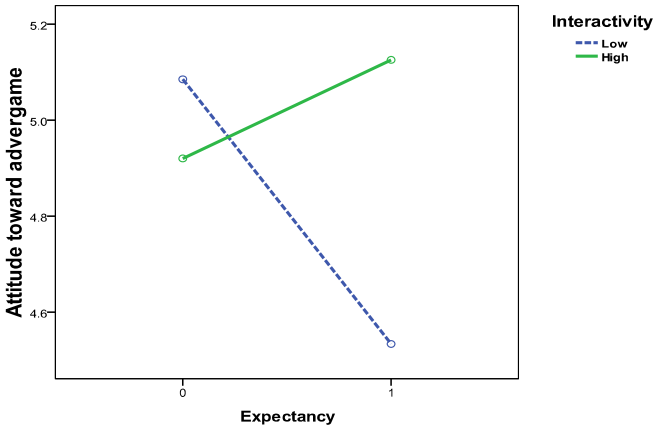


Figure 9. Interaction Effect (Expectancy * Interactivity)

Results on Attitude toward Brand

The descriptive statics of the experiment treatments on attitude toward brand were presented in Table 8. The results of an ANCOVA test on the dependent variable attitude toward brand showed that only the main effect of interactivity is significant (see Table 9). One of the covariates, attitude toward the brand before the experiment showed to be significant ($F = 15.217$, $p < 0.05$) which was controlled by our ANCOVA test.

Table 8. Descriptive Statistics on Attitude toward Brand

Mean (N, SD)		Expectancy (High)	Expectancy (Low)
Interactivity (High)	Relevancy (High)	4.98 (16, 0.72)	5.30 (14, 0.69)
	Relevancy (Low)	4.98 (16, 1.00)	4.88 (14, 0.84)
Interactivity (Low)	Relevancy (High)	4.69 (14, 0.90)	4.50 (15, 0.88)
	Relevancy (Low)	4.69 (16, 0.81)	4.94 (16, 0.64)

In support of H4, the main effect of interactivity was found to be significant ($F = 5.652$, $p < 0.05$). However, the main effect for relevancy was not significant ($F = 0.612$, $p > 0.05$). Thus, H5 was not supported. As for H6, the main effect for expectancy was not significant ($F = 1.823$, $p > 0.05$). Thus, H6 was not supported.

Table 9. Results of ANCOVA on Attitude toward Advergame, $R^2 = 29.4\%$

Source		df	Mean Square	F	Sig.
Covariates	Brand Familiarity	1	.435	.810	.370
	General Attitude toward ad	1	.265	.493	.484
	Ab before the Experiment	1	8.175	15.217	**.000****
	Experience in Racing Games	1	.053	.098	.755
	Gender	1	.749	1.395	.240
	Age	1	1.529	2.847	.094
Main Effect	Interactivity (Int)	1	3.036	5.652	**.019***
	Relevancy (Rel)	1	.329	.612	.436
	Expectancy (Exp)	1	.979	1.823	.180
Interaction Effect	Int * Rel	1	.889	1.656	.201
	Int * Exp	1	.053	.098	.755
	Rel * Exp	1	.180	.336	.563
	Int * Rel * Exp	1	1.078	2.006	.160
*p < 0.05, **p < 0.01					

Discussion and Implications

This study investigated the impact of advergame design elements, in terms of interactivity, relevancy and expectancy, on advertising effectiveness. Based on the HCI and advertising literature, interactivity, relevancy and expectancy are considered as potentially important factors for the focal examination. Overall, we find that all the two-way interactions between these three design elements on attitude toward advergame are significant. Our findings also suggest that interactivity has a significant main effect on attitude toward brand.

First, the impact of interactivity is contingent on the level of relevancy. In the high relevancy condition, high interactivity leads to more favorable attitude toward advergame than low interactivity. In contrast, in the condition of low relevancy, interactivity seems immaterial in changing the attitude toward advergame. As the transportation experience will be impeded by intrusiveness and a low level of relevancy does arouse this intrusiveness perception. Thus, the interactivity becomes ineffective when the player feel intruded by the low relevancy.

Second, the impact of expectancy is contingent on the level of relevancy. In high relevancy condition, low expectancy leads to more favorable attitude toward advergame than high expectancy. In contrast, in the condition of low relevancy, expectancy failed to stimulate a favorable attitude toward advergame. As discussed above, the transportation experience will be disrupted by the intrusiveness due to a low level of advertising relevancy. Thus, the expectancy was not able to provoke more positive attitude toward the advergame in the condition of low relevancy.

Third, the significant interaction effect between interactivity and expectancy shows the expectancy is contingent on interactivity. Contrary to our hypothesis argument, in the low interactivity condition rather than high interactivity condition, the low expectancy draws more favorable attitude toward advergame comparing to high expectancy. On the other hand, in the high interactivity condition, low expectancy failed to arouse better attitude toward advergame than high expectancy. The opposite finding to our argument could be due to the fact that in the high interactivity condition, the player may be too immersed in the transportation experience so that a majority of a player's attention is spent on the interactive aspects of the advergame. Thus, a negligible amount of the player's cognitive evaluation is dedicated to the expectancy feature (Grigorovici et al. 2004; Lee et al. 2007). However, in the low interactivity condition, the player does not need to pay much attention on the interactivity and they have enough information capacity to look at the expectancy feature. Therefore, in this case, a low level of expectancy can attract the player through its novelty and encourage the player to further explore the advergame. As a result of the fun experience associated with the novelty of the advergame, a positive attitude toward advergame may be generated.

Fourth, interactivity has a significant impact on player's attitude toward the brand. This is actually consistent with the transportation theory that positive attitude toward the advergame may be transferred to the attitude toward brand itself (Green et al. 2004). Fifth, relevancy shows no significant effect on attitude toward brand. High relevancy cannot leads to better attitude toward brand. This could be the reason that high relevancy can only prevent the intrusiveness but cannot independently stimulate the transportation experience. Thus, relevancy alone has no impact on attitude toward brand. Sixth, the effect of expectancy on attitude toward brand is not significant. Low expectancy alone failed to arouse more favorable attitude toward brand. This may be the reason that in a short time period, positive transportation experience triggered by low expectancy only can hardly be transferred to the advertised brand. Thus, the expectancy has no impact on the attitude toward brand.

Implications for Theory

In previous studies on the effectiveness (Dahl et al. 2009; Gurău 2008; Hernandez et al. 2004; Lee et al. 2009; Mallinckrodt et al. 2007; Winkler et al. 2006; Wise et al. 2008; Youn et al. 2005), few of them focused on the design elements on the advergame. Based on the HCI and advertising literature, this paper proposed three important design elements for advergame: interactivity, relevancy, and expectancy. Using transportation theory, we explained how the three design elements influence the effectiveness of advergame. We proposed that with proper combination of the manipulations of these three design elements, an increased level of advertising effectiveness can be achieved.

By specifically defining interactivity as a design element in an advergame context, we set up a theoretical linkage between the brand integration and the extent of control in viewing the advertising message. In advergames with high level of interactivity, the player will have extensive control on the choice of viewing the advertising message. In advergames, the brand is integrated with game components and these components can help the player to win by providing bonus gaming aids. In order to win, the player will be stimulated to view the advertising message in an interactive way. The result showed this interactive advertising played a dominant role in an advergame context compared to the previous passive advertising placed in the advergame.

To explain past conflicting findings of congruity in gaming platforms (Dahl et al. 2009; Gurău 2008; Hein 2006; Hernandez et al. 2004; Mallinckrodt et al. 2007; Winkler et al. 2006; Wise et al. 2008; Youn et al. 2005), this paper provided a deep insight into the influence of two separate dimensions for congruity: relevancy and expectancy. According to our result, high interactivity and low expectancy are able to engender better attitudes toward advergame in the presence of high relevancy. In contrast to our hypothesis, low expectancy condition only generates better attitudes toward advergame in the condition of low interactivity.

Based on the dual mediation hypothesis, the potential influences of the three design elements on attitude toward brand are proposed. The significant main effect of interactivity suggests that comparing with the other two design elements, interactivity plays a more important role in influencing players' attitude toward brand.

Implications for Practice

From the findings of this study, we provide practical implications for advertisers and game developers to improve the design of advergames in order to promote their brand or product in an effective manner. With proper combination of the manipulations on our proposed three design elements of advergames, an advertiser can optimally design an advergame which best fits their advertised brand or product according to the objective of a marketing or advertising campaign.

From the result we can see that interactivity is influential in determining the effectiveness of the advertising, both from the interaction effects on attitude toward advergame and the main effect on attitude toward brand. Through the customized design of an advergame, the advertiser can integrate the advertising message together with an attractive game component so that players are more likely to interact with. And with the specialized interactive nature of game, advergame provide more opportunities for the advertiser to attract players to interact with the advertising message. The advertiser can take this advantage and find the optimal game component to integrate the advertising information. The idea to create more interaction between consumers and advertising message is actually applied in the cutting edge advertising strategy, like Apple iAd mobile advertising platform (Gerhart et al. 2010; Steel 2010).

From the result relating to the relevancy we can see that relevancy is crucial because the high interactivity and low expectancy can only be effective in the presence of high relevancy. Therefore, the advertiser better need to categorize their brand or product and find a game whose theme fits with the brand image. Only through such fitness, less intrusiveness will be felt and more positive feelings will be drawn.

From the findings, we also see that if the advertiser may not be able to effect a high level of interactivity for some brand or product, they can also design an advergame with low expectancy which can still hold the player's attention with the novelty created. This low expectancy will be even more effective when the relevancy is successfully been manipulated to a high level. The advertiser should leverage on these three design elements of the advergame to design an advergame best customized for their brand or product and achieve the advertising effectiveness.

Limitations and Future Research

There are limitations to this study and we propose avenues for future study. First, for the brand we used in the experiment, they are both familiar to most of the experiment subjects. The attitude toward the brand may be largely influenced by the prior knowledge of the brand. Although we have controlled the attitude toward the brand before the experiment, unknown brands may be used in future studies. By using unknown brands, more accurate conclusions may be drawn from the finding on attitude toward brand. Second, as to keep the manipulation on expectancy clean, we manipulated the low expectancy as crab driving in the experiment. However, in the real design for the Red Bull brand, a bull riding game will be a more "ideal" situation. We did not use a bull riding scenario in the experiment is because bull appears in the logo of the brand which may confound the effect of the relevancy treatment. Third, a racing game requires much of the attention toward the game itself and less attention will be paid to the advertising message during the advergame. The player may not have enough time or cognitive resources to evaluate the advertising information. Thus, a more leisurely game with less demand for cognitive resources can be customized into an advergame for further investigations. Fourth, a field study instead of laboratory experiment can be applied to further investigate the actual purchase behavior of the player. Challenging each other among the friends in the advergame can be introduced to study aspects of viral marketing in a social media platform.

Conclusion

In conclusion, this study examines the roles of interactivity, relevancy, and expectancy on the effectiveness of advergames. Based on the transportation theory, this study focuses on the three contingent variables and develops a comprehensive and integrated model for the understanding of design elements in the advergame environment. The findings suggest that the interactivity element is an important factor which can trigger the transportation experience and shows positive effects on both attitude toward advergame and attitude toward brand. In addition, robust interaction effects of the three design elements were validated as proposed by our hypotheses, i.e., high interactivity and low expectancy both lead to a higher attitude toward advergame under a high level of relevancy. One interesting finding that is opposite to our argument is that a low expectancy leads to more favorable attitude toward advergame under a low level of interactivity.

Reference

Afshar, R., Jones, C., and Banerjee, D. *Advergaming Developer's Guide* Charles River Media, Hingham, Massachusetts, 2004.

Barry, T. "The development of the hierarchy of effects: an historical perspective," *Current issues and Research in Advertising* (10:2) 1987, pp 251-295.

Berman, J., and Weitzner, D. "Abundance and user control: Renewing the democratic heart of the First Amendment in the age of interactive media," *Yale Law Journal* (104:7) 1995.

Bezjian-Avery, A., Calder, B., and Iacobucci, D. "New media interactive advertising vs. traditional advertising," *Journal of Advertising Research* (38) 1998, pp 23-32.

Blattberg, R., and Deighton, J. "Interactive Marketing: Exploiting the Age of Addressability," *Sloan Management Review* (33:1) 1991, pp 5-14.

Brock, T., and Livingston, S. "The Need for Entertainment Scale," in: *The psychology of entertainment media: Blurring the lines between entertainment and persuasion*, Erlbaum, Mahwah, NJ, 2004, pp. 255-274.

Buckner, K., Fang, F., and Qiao, S. "Advergaming: A New Genre in Internet Advertising " *SoCbytes Journal* (2:1) 2002.

Castel, A., Pratt, J., and Drummond, E. "The effects of action video game experience on the time course of inhibition of return and the efficiency of visual search," *Acta Psychologica* (119:2) 2005, pp 217-230.

Cho, C., and Leckenby, J. "Internet-related programming technology and advertising," AMERICAN ACADEMY OF ADVERTISING, 1997, pp. 69-79.

Cook, T., Campbell, D., and Day, A. *Quasi-experimentation: Design & analysis issues for field settings* Houghton Mifflin, Boston, 1979.

Cronbach, L. "Coefficient alpha and the internal structure of tests," *Psychometrika* (16:3) 1951, pp 297-334.

Dahl, S., Eagle, L., and Ba´ez, C. "Analyzing Advergames: Active Diversions or Actually Deception. An Exploratory Study of Online Advergames Content," *Young Consumers* (10:1) 2009, pp 46-59.

Deighton, J. "The Future of Interactive Marketing," *Harvard Business Review* (74:6) 1996, pp 151-161.

Dolich, I. "Congruence relationships between self images and product brands," *Journal of Marketing Research* (6:1) 1969, pp 80-84.

Edwards, S.M., Hairong, L., and Lee, J.-H. "Forced Exposure and Psychological Reactance: Antecedents and Consequences of the Perceived Intrusiveness of Pop-Up Ads," *Journal of Advertising* (31:3) 2002, pp 83-95.

Escalas, J. "Imagine yourself in the product: Mental simulation, narrative transportation, and persuasion," *Journal of Advertising* (33:2) 2004, pp 37-48.

Gardner, M.P. "Does Attitude Toward the Ad Affect Brand Attitude Under a Brand Evaluation Set?," *Journal of Marketing Research* (22:2) 1985, pp 192-198.

Gerhart, A., and Hussey, T. "Apple iAd Mobile Advertising Platform: A Mobile Gamechanger," 2010.

Glass, Z. "The Effectiveness of Product Placement in Video Games," *Journal of Interactive Advertising* (8:1) 2007.

Goodman, G. "Picture memory: How the action schema affects retention* 1," *Cognitive Psychology* (12:4) 1980, pp 473-495.

Green, C., and Bavelier, D. "Action-video-game experience alters the spatial resolution of vision," *Psychological Science* (18:1) 2007, p 88.

Green, M., Brock, T., and Kaufman, G. "Understanding media enjoyment: The role of transportation into narrative worlds," *Communication Theory* (14:4) 2004, pp 311-327.

Green, M.C., and Brock, T.C. "The Role of Transportation in the Persuasiveness of Public Narratives," *Journal of Personality and Social Psychology* (79:5) 2000, pp 701-721.

Grigorovici, D.M., and Constantin, C.D. "Experiencing Interactive Advertising beyond Rich Media: Impacts of Ad Type and Presence on Brand Effectiveness in 3D Gaming Immersive Virtual Environments," *Journal of Interactive Advertising* (5:1) 2004, pp 1-26.

Gurău, C. "The Influence of Advergames on Players' Behaviour: An Experimental Study," *Electronic Markets* (18:2) 2008, pp 106-116.

Hastie, R. "Memory for Information Which Confirms or Contradicts a General Impression," in: *Person Memory: The Cognitive Basis of Social Perception*, Hillsdale, NJ: Erlbaum, 1980, pp. 155-177.

Hastie, R. "Schematic Principles in Human Memory," in: *Social Cognition: The Ontario Symposium*, Hillsdale, NJ: Erlbaum, 1981, pp. 155-177.

Heckler, S.E., and Childers, T.L. "The Role of Expectancy and Relevancy in Memory for Verbal and Visual Information: What Is Incongruency?," *Journal of Consumer Research* (18:4) 1992, pp 475-492.

Hernandez, M.D., Chapa, S., Minor, M.S., and Maldonado, C. "Hispanic Attitudes toward Advergames: A Proposed Model of their Antecedents," *Journal of Interactive Advertising* (5:1) 2004.

Hoffman, D., and Novak, T. "Marketing in hypermedia computer-mediated environments: conceptual foundations," *The Journal of Marketing* (60:3) 1996, pp 50-68.

Holbrook, M., Chestnut, R., Oliva, T., and Greenleaf, E. "Play as a consumption experience: The roles of emotions, performance, and personality in the enjoyment of games," *Journal of Consumer Research* (11:2) 1984, pp 728-739.

Homer, P.M. "The Mediating Role of Attitude Toward the Ad: Some Additional Evidence," *Journal of Marketing Research* (27:78-86) 1990.

Homer, P.M. "Relationships Among Ad-Induced Affect, Beliefs, and Attitudes: Another Look," *Journal of Advertising* (35:1) 2006, pp 35-51.

Kafai, Y. *Minds in play: Computer game design as a context for children's learning* Lawrence Erlbaum, 1995.

Kahneman, D. *Attention and Effort* Prentice Hall, Englewood Cliffs NJ, 1973.

Kamins, M. "An investigation into the" match-up" hypothesis in celebrity advertising: When beauty may be only skin deep," *Journal of Advertising* (19:1) 1990, pp 4-13.

Kent, R., and Allen, C. "Competitive interference effects in consumer memory for advertising: The role of brand familiarity," *The Journal of Marketing* (58:3) 1994a, pp 97-105.

Kent, R.J., and Allen, C.T. "Competitive Interference Effects in Consumer Memory for Advertising: The Role of Brand Familiarity," *Journal of Marketing* (58:3) 1994b, pp 97-105.

Kretchmer, S.B. "Advertainment: The Evolution of Product Placement as a Mass Media Marketing Strategy," *Journal of Promotion Management* (10:1/2) 2004, pp 37-54.

Lee, M., Choi, Y., Quilliam, E.T., and Cole, R.T. "Playing With Food: Content Analysis of Food Advergames," *Journal of Consumer Affairs* (43:1) 2009, pp 129-154.

Lee, M., and Faber, R.J. "Effects of Product Placement In On-Line Games on Brand Memory," *Journal of Advertising* (36:4) 2007, pp 75-90.

Liu, Y., and Shrum, L. "What is interactivity and is it always such a good thing? Implications of definition, person, and situation for the influence of interactivity on advertising effectiveness," *Journal of Advertising* (31:4) 2002, pp 53-64.

Lutz, R. "Affective and cognitive antecedents of attitude toward the ad: A conceptual framework," *Psychological processes and advertising effects*) 1985, pp 45-63.

Lutz, R.J., MacKenzie, S.B., and Belch, G.E. "Attitude Toward the Ad as a Mediator of Advertising Effectiveness: Determinants and Consequences," in: *Advances in Consumer Reseearch,* R.P. Bagozzi and A.M. Tybout (eds.), Association for Consumer Research, Ann Arbor, 1983, pp. 532-539.

MacKenzie, S.B., and Lutz, R.J. "An Empirical Examination of the Structural Antecedents of Attitude toward the Ad in an Advertising Pretesting Context," *Journal of Marketing* (53:2) 1989, pp 48-65.

MacKenzie, S.B., Lutz, R.J., and Belch, G.E. "The Role of Attitude toward the Ad as a Mediator of Advertising Efectiveness: A Test of Competing Explanations," *Journal of Marketing Research* (23:2) 1986, pp 130-143.

Mallinckrodt, V., and Mizerski, D. "The effects of playing an advergame on young children's perceptions, preferences, and requests," *Journal of Advertising* (36:2) 2007, pp 87-100.

Malone, T.W. "What Makes Computer Games Fun?," *Byte* (6) 1981, pp 258-277.

McQuarrie, E., and Mick, D. "On resonance: A critical pluralistic inquiry into advertising rhetoric," *Journal of Consumer Research* (19:2) 1992, pp 180-197.

Miniard, P.W., and Sunil Bhatla, r.L.R. "On the formation and Relationship of Ad and Brand Attitudes: An Experimental and Causal Analysis," *Journal of Marketing Research* (27:3) 1990, pp 290-303.

Misra Sharon, E. "Celebrity spokesperson and brand congruence:: An assessment of recall and affect," *Journal of Business Research* (21:2) 1990, pp 159-173.

Mittal, B. "The Relative Roles of Brand Beliefs and Attitude toward the Ad as Mediators of Brand Attitude: A Second Look," *Journal of Marketing Research* (27:2) 1990, pp 209-219.

Molesworth, M. "Real Brands in Imaginary Worlds: Investigating Players' Experiences of Brand Placement in Digital Games," *Journal of Consumer Behaviour* (5) 2006, pp 355-366.

Monroe, K. "The influence of price differences and brand familiarity on brand preferences," *Journal of Consumer Research* (3:1) 1976, pp 42-49.

Moore, R., Stammerjohan, C., and Coulter, R. "Banner advertiser-web site context congruity and color effects on attention and attitudes," *Journal of Advertising* (34:2) 2005, pp 71-84.

Nelson, M.R. "Recall of Brand Placement in Computer/Video Games," *Journal of Advertising* (42:2) 2002, pp 80-92.

Nelson, M.R., Keum, H., and Yaros, R.A. "Advertainment or Adcreep Game Players' Attitudes toward Advertising and Product Placements in Computer Games," *Journal of Interactive Advertising* (5:1) 2004, pp 1-30.

Nelson, M.R., Yaros, R.A., and Keum, H. "Examining the Influence of Telepresence on Spector and Player Processing of Real and Fictitious Brands In a Computer Game," *Journal of Advertising* (35:4) 2006, pp 87-99.

Nicovich, S. "The effect of involvement on ad judgment in a video game environment: The mediating role of presence," *Journal of Interactive Advertising* (6:1) 2005, pp 38-51.

Nunnally, J., Bernstein, I., and Berge, J. *Psychometric theory* McGraw-Hill, New York, 1994.

Pavlik, J. *New media technology: Cultural and commercial perspectives* Allyn & Bacon, 1996.

Perdue, B., and Summers, J. "Checking the success of manipulations in marketing experiments," *Journal of Marketing Research* (23:4) 1986, pp 317-326.

Qin, H., Rau, P.-L.P., and Savendy, G. "Measuring Player Immersion in the Computer Game Narrative," *Journal of Human-Computer Interaction* (25:2) 2009, pp 107-133.

Rafaeli, S. "Interactivity: From new media to communication," *Sage Annual Review of Communication Research: Advancing Communication Science* (16) 1988, pp 110-134.

Rafaeli, S., and Sudweeks, F. "Networked interactivity," *Journal of computer mediated communication* (2:4) 1997, p 1997.

Raney, A., Arpan, L.M., Pashupati, P., and Brill, D.A. "At the Movies, On the Net: An Investigation of the Effects of Entertaining and Interactive Web Content on Site and Brand Evaluations," *Journal of Interactive Marketing* (17:4) 2003, pp 38-53.

Russell, C. "Investigating the effectiveness of product placements in television shows: The role of modality and plot connection congruence on brand memory and attitude," *Journal of Consumer Research* (29:3) 2002, pp 306-318.

Scrull, T.K. "Person Memory: Some Tests of Associative Storage and Retrieval Models," *Journal Experimental Psychology: Human Learning and Memory* (7:6) 1981, pp 440-463.

Shamdasani, P.N., Stanaland, A.J.S., and Tan, J. "Location, Location, Location: Insights for Advertising Placement on the Web," *Journal of Advertising Research* (41:4) 2001, pp 7-21.

Shneiderman, B., and Plaisant, C. *Designing the user interface* Addison-Wesley Reading, MA, 1998.

Shrum, L.J. *The Psychology of Entertainment Media: Blurring the Lines Between Entertainment and Persuasion* Lawrence Erlbaum, Mahwah, N.J.; London, 2004.

Smith, A. "Exploring advergaming and its online advertising implications," *International Journal of Business Information Systems* (2:3) 2007, pp 298-311.

Sparkman, R.M., and Locander, W.B. "Attribution Theory and Advertising Effectiveness," *Journal of Consumer Research* (7) 1980, pp 219-224.

Srull, T., and Wyer, R.S. "Person Memory and Judgment," *Psychological Review* (96:1) 1989, pp 58-83.

Srull, T.K., Lichtenstein, M., and Rothbart, M. "Associative Storage and Retrieval Processes in Person Memory," *Journal of Experimental Psychology: Learn, Memory and Cognition* (11:2) 1985, pp 316-345.

Steel, E. "Apple to Charge a Premium to Put Ads in Mobile Apps," 2010.

Steuer, J. "Defining Virtual Reality: Dimensions Determining Telepresnce," *Journal of Communication* (42:4) 1992, pp 73-93.

Steuer, J., Biocca, F., and Levy, M. "Defining virtual reality: Dimensions determining telepresence," *Communication in the age of virtual reality*) 1995, pp 33-56.

Sweetser, P., and Wyeth, P. "GameFlow: a model for evaluating player enjoyment in games," *Computers in Entertainment (CIE)* (3:3) 2005, p 3.

Turkle, S. *Life on the Screen: Identity in the Age of the Internet* Touchstone Books, New York, 1997.

Van der Graaf, S., and Nieborg, D.B. "Together We Brand: America's Army," Level Up: Digital Games Research Conference, University of Utrecht & Digital Games Research Association (DiGRA), Utrecht University, 2003.

Wang, J., and Calder, B. "Media transportation and advertising," *Journal of Consumer Research* (33:2) 2006, pp 151-162.

Williams, F., Rice, R., and Rogers, E. *Research methods and the new media* Free Pr, 1988.

Winkler, T., and Buckner, K. "Receptiveness of gamers to embedded brand messages in advergames: Attitudes towards product placement," *Journal of Interactive Advertising* (7:1) 2006, pp 37-46.

Wise, K., Bolls, P., Kim, H., Venkataraman, A., and Meyer, R. "Enjoyment of Advergames and Brand Attitudes: The Impact of Thematic Relevance," *Journal of Interactive Advertising* (9:1) 2008, pp 27-36.

Wu, G. "Perceived interactivity and attitude toward web sites," Citeseer, 1999, pp. 254-262.

Yang, M., Roskos-Ewoldsen, D.R., Dinu, L., and Arpan, L.M. "The Effectiveness of "In-Game" Advertising," *Journal of Advertising* (35:4) 2006, pp 143-152.

Yi, Y. "The Effects of Contextual Priming in Print Advertisements," *Journal of Consumer Research* (17) 1990, pp 215-222.

Youn, S., and Lee, M. "Advergame Playing Motivations and Effectiveness," *Advertising, promotion, and new media*) 2005, p 320.

Zhang, Y., and Gelb, B. "Matching advertising appeals to culture: The influence of products' use conditions," *Journal of Advertising* (25:3) 1996, pp 29-46.